UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
OSB2002-0059-FEC

May 1, 2002

Mr. Fred P. Patron
Senior Transportation Planning Engineer
Federal Highway Administration, Oregon Division
530 Center Street NE
Salem, OR 97301

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation, Highway 26 Zigzag to Rhododendron (Phase 1), Bear Creek Watershed, Clackamas County, Oregon

Dear Mr. Patron:

Enclosed is a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act (ESA) for the Highway 26 Zigzag to Rhododendron (Phase 1) Project, Bear Creek Watershed, Clackamas County, Oregon. NMFS concludes in this Opinion that the proposed actions are not likely to jeopardize Lower Columbia River (LCR) steelhead (*Oncorhynchus mykiss*) or LCR chinook salmon (*O. tshawytscha*) or destroy or adversely modify designated critical habitat. Pursuant to section 7 of the ESA, NMFS has included reasonable and prudent measures with non-discretionary terms and conditions that NMFS believes are necessary and appropriate to minimize the potential for incidental take associated with this project. This Opinion also serves as consultation on Essential Fish Habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and its implementing regulations (50 CFR Part 600).

Please direct any questions regarding this letter to Art Martin of my staff in the Oregon Habitat Branch at 503.231.6848.

Sincerely,

for Robert Lohn
Acting Regional Administrator

cc: Rose Owens, ODOT
Greg Robart, ODFW
Diana Hwang, USFWS
Anne MacDonald URS

Endangered Species Act
Section 7 Consultation
&
Magnuson-Stevens Act
Essential Fish Habitat Consultation

BIOLOGICAL OPINION

Zigzag to Rhododendron (Phase 1)
Clackamas County, Oregon

Agency: Federal Highway Administration

Consultation Conducted by: National Marine Fisheries Service,
Northwest Region

Date Issued: May 1, 2002

Issued by:

for D. Robert Lohn
Regional Administrator

Refer to: OHB2002-0059-FEC

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1. ENDANGERED SPECIES ACT

1.1 Background

On March 13, 2002, the National Marine Fisheries Service (NMFS) received a biological assessment (BA) and a request from the Federal Highway Administration (FHWA) for Endangered Species Act (ESA) section 7 formal consultation for the proposed Highway 26 Zigzag to Rhododendron (Phase 1) project located in the Bear Creek Watershed, Clackamas County, Oregon. The project applicant is the Oregon Department of Transportation (ODOT). The ODOT is the designated non-federal representative for the Federal Highway Administration (FHWA).

The project will widen a 2.18 kilometer (km) segment of Highway 26, replace the current culvert crossing with a bridge over Bear Creek (a tributary to the Sandy River), construct a stormwater treatment system, and relocate approximately 600 meters (m) of the Bear Creek channel to restore complex fish habitat and prevent the future degradation of habitat from highway associated impacts. This biological opinion (Opinion) is based on the information presented in the BA, project development meetings, site visits, and discussions with ODOT, the United States Forest Service (USFS), and project consultants. This consultation is undertaken pursuant to section 7(a)(2) of the ESA and its implementing regulations (50 CFR Part 402), and pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and its implementing regulations (50 CFR Part 600).

This Opinion considers the potential effects of the proposed actions on Lower Columbia River (LCR) steelhead (*Oncorhynchus mykiss*) and LCR chinook salmon (*O. tshawytscha*) which occur in the proposed project area. The LCR steelhead were listed by the National Marine Fisheries Service (NMFS) as threatened under the ESA on March 19, 1998 (63 FR 13347) and the LCR chinook salmon as threatened under the ESA on March 24, 1999 (64 FR 14308). NMFS designated critical habitat for these species on February 16, 2000 (65 FR 7764) and issued protective regulations on July 10, 2000 (65 FR 42422).

1.2 Proposed Actions

The proposed actions include four major components: 1) Highway widening for increased travel capacity and safety; 2) replacement of the current Bear Creek culvert crossing with a bridge; 3) construction of a stormwater treatment system to both treat water quality and mitigate potential adverse hydrologic effects resulting from project impervious surfaces; and 4) relocation of approximately 600 meters of the current Bear Creek channel away from the highway to improve instream and riparian functions.

The project BA includes a set of conservation measures or best management practices (BMPs) designed to minimize adverse effects on steelhead, salmon and their habitats. These BMPs are described on pages 36-52 of the BA. Specific BMPs for in-water work, channel relocation, bank work, bridge construction, highway construction, clearing and grubbing, erosion control,

hazardous materials, dewatering and in-water work area isolation, fish rescue and salvage, temporary stream diversions, and site-specific conservation measures are included. The NMFS regard these BMPs as integral components of the project and considers them to be part of the proposed actions.

Direct effects to listed species will occur at the project site and may extend upstream or downstream based on the potential for impairing fish passage, hydraulics, sediment and pollutant discharge, and the extent of riparian habitat modifications. Indirect effects to listed species may occur throughout the watershed where actions described in this Opinion lead to additional activities or affect ecological functions contributing to stream degradation. As such, the action area for the proposed activities include the immediate watershed where the proposed action will occur, and those areas upstream and downstream that may reasonably be affected, temporarily or in the long term. For the purposes of this Opinion, the action area is defined as the streambed and streambank of Bear Creek extending to the upstream project disturbance limits and downstream one mile below the project disturbance limits. Other areas of the Bear Creek watershed will not be directly affected. There will be temporary indirect effects (temperature modification and sedimentation) to Bear Creek, within the action area, caused by the in-water work, channel relocation, and general riparian and bank disturbance within the project area.

All in-water work activities will occur during the standard in-water work timing guideline[1] of July 15 through August 31.

1.2.1 Highway Widening

The 2.18-km long segment of Highway 26 between the towns of Zigzag and Rhododendron (mile point 42.22 to mile point 43.57) will be widened to accommodate heavy traffic volumes and improve safety. The new highway segment will provide four 3.6 m wide travel lanes, a 4.2 m wide median, and 1.8 m wide shoulders for an average highway width of 22.2 m. The paved shoulder will increase by 0.6 m in width along portions of the new highway segment requiring placement of guardrails or concrete barriers. As a result of commitments by FHWA in the Mount Hood Highway Corridor Environmental Impact Statement (EIS) to avoid and minimize environmental impacts, the project has already minimized the increase of new highway width. Design changes associated with highway width minimization have resulted in various changes to the paved surface of the highway system at intersections, turnouts and frontage roads within the project segment. The proposed action will result in a net increase of 16,350 m^2 of new impervious surface and a total of 53,450 m^2 of total impervious surface.

Type C or F concrete curbs and guardrail will be installed along the most of the project segment. Precast concrete barriers with glare shields will be installed along the Woodlands frontage road where it runs adjacent to the project segment. Fifteen additional drainage cross culverts will be

[1]Oregon Department of Fish and Wildlife, *Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 12 pp (June 2000)(identifying work periods with the least impact on fish)(http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt/0600_inwtrguide.pdf).

moved or replaced to convey stormwater and coordinate various aspects of the new stormwater treatment system.

1.2.2 Bridge Construction

The proposed actions includes replacement of the existing double 1.2-m diameter corrugated metal pipe (CMP) culverts at the Bear Creek crossing with a bridge. The new bridge will consist of two 8.0-m long, 11.7-m wide single, cast-in-place, concrete slabs. The finished bridge deck will be a 27.2-m wide, 8.0-m long span over Bear Creek. Bridge foundation construction will consist of reinforced concrete bent caps on six 915 millimeter (mm) drilled shafts at each bent. Bridge construction will require drilling equipment and cast-in-place concrete work.

Because the highway widening construction will occur concurrently with bridge construction, a temporary 2.06-m span, 1.5-m rise arched culvert extension on the outlet end on the existing culvert crossing will be required. This temporary culvert extension will be constructed during the standard in-water work timing guideline of July 15 through August 31. The culvert extension will be designed and constructed to provide for upstream and downstream passage of all salmonid life stages while the culvert extension is needed.

While Bear Creek continues to flow through the existing culverts (the proposed culvert extension and the existing adjacent Bear Creek channel), the new Bear Creek bridge will be completely constructed in the dry over the proposed relocation channel. After completion of the new Bear Creek bridge and the relocated channel, Bear Creek will be introduced into the new reach and the existing culvert and culvert extension removal and/or decommissioning will occur completely in the dry.

1.2.3 Stormwater Treatment System

Various engineered and non-engineered stormwater treatment BMPs will be incorporated into the proposed action to restore Bear Creek water quality and hydrologic function. The integrated stormwater management system will include: Water quality treatment swales, a water quality treatment wetland, water quality treatment detention basins to settle and remove traction gravels, proprietary water quality treatment devices, approximately 1300 m of vegetated "step channel"[2] water quality treatment channels, natural filtration and infiltration through riparian buffers, and sheet flow discharge of stormwater where appropriate from new and existing impervious surfaces. Engineered water quality BMPs are designed to facilitate up to the water quality storm

[2]A step channel is designed with a wide bottom, a series of boulder check dams, and a bottom that is vegetated or has cobbled areas. This design reduces water velocities allowing sediments and pollutants to settle. The additional head created by the water depth behind each check dam increase infiltration potential. The vegetated portions of channel slow water velocities and increase filtration potential.

event[3] with additional stormwater runoff bypassed to non-engineered water quality BMPs. Non-engineered BMPs strategically make use local topography, soils, and vegetation to maximize passive water quality treatment and attenuate peak discharge. Although most of the non-engineered stormwater BMPs are not designed for specific water quality treatment and hydrologic performances, they will result in significant water quality and hydrologic benefits to Bear Creek.

Approximately 14% of the stormwater runoff from new and existing impervious surfaces will be routed to a stormwater water quality treatment man hole and then into a 50-m long "step channel" designed to decrease water velocity, settle suspended solids and associated pollutants, attenuate peak discharges, and increase potential for both infiltration and filtration prior to discharge to Bear Creek. The water quality treatment man hole will remove some floatables, heavy metals, and 50% or greater total suspended solids (TSS) from the water quality storm event.

Approximately 10% of the stormwater runoff from new and existing impervious surfaces will be routed to a series of sediment basins designed to settle traction gravels for later removal during dry periods. These sediment basins will also settle some suspended solids and associated pollutants, attenuate peak discharges and increase potential for infiltration. Stormwater discharge from the sediment basins will be routed to an enhanced wetland/detention facility. This facility will provide water quality treatment through further settling of suspended solids and associated pollutants and filtration through natural wetland vegetation. This facility will treat water quantity through natural attenuation of peak flows and infiltration of stormwater. The enhanced wetland/detention facility has been sized to ensure the reduction of the post-construction peak discharge down to the pre-construction peak discharge for the water quality storm prior to discharge to Bear Creek.

Approximately 17% of the stormwater runoff from new and existing impervious surfaces will be routed to and discharged, as sheet flow, across 20 to 30-m wide riparian buffer strips. Given the soil types, topography, and vegetated character of the buffer strips, 80-100% of the stormwater will be infiltrated or evapotransporated from the water quality storm event. The remainder of the stormwater will filtrate through riparian sheet flow prior to seeping into Bear Creek.

The majority of the remaining 59% of the stormwater runoff from new and existing impervious surfaces will be routed to a 800-m long "step channel"designed to decrease water velocity, settle suspended solids and associated pollutants, attenuate peak discharges, and increase potential for both infiltration and filtration. Stormwater discharge from the 800-m long "step channel" will be routed to another 150-m long "step channel" enhanced with between two and five inline sediment detention basins designed to settle traction gravels for later removal during dry periods. These sediment basins will also settle some suspended solids and associated pollutants, attenuate

[3]For this project the water quality storm event is defined as 2/3 of the 2-year 24-hour storm and based on studies by the City of Portland, The FHWA assumes this will encompass at least 95% of the annual precipitation for the project area.

peak discharges and increase potential for infiltration prior to discharge to Bear Creek. A much smaller portion of the remaining 59% of the stormwater runoff from new and existing impervious surfaces will be routed to a separate 300-m long "step channel" designed to decrease water velocity, settle suspended solids and associated pollutants, attenuate peak discharges, and increase potential for both infiltration and filtration prior to discharge to Bear Creek.

1.2.4 Bear Creek Channel Relocation

The proposed action includes relocation of approximately 600-m of Bear Creek channel from its current location (functioning as a road-side ditch) away from Highway 26 into the adjacent forested lowlands to reestablish functional, complex in-stream fish habitat and a forested riparian buffer. Channel relocation will occur in four segments: 1) East Reach; 2) Bridge Reach; 3) Middle Reach; and 4) Western Reach.

Relocation Reach Design. The exact design and location of the relocated channels will vary during construction depending on the ability to work within and around large trees and other natural topographical features such as large boulders, downed woody debris and depressions. The final channel for each reach will be determined based on specific performance criteria designed to maximize habitat quality for salmonid species, resident aquatic species, and terrestrial wildlife species tailored to the proximal valley and specific hydraulic characteristics of the site. A natural, 100-m long stream channel segment of Bear Creek exists north of the highway. This channel segment contains complex salmonid habitats suitable to the target species and will be used as a model reach for the relocated reaches during construction.

The specific performance criteria for the three non-bridge reaches will be based on best available science and site-specific forested conditions available along the proposed alignments. Specific performance criteria will be tailored to achieve properly functioning conditions (PFC). The PFC is defined as "...the sustainable presence of natural habitat-forming processes (e.g., hydraulic runoff, bedload transport, channel migration, riparian vegetation succession) that are necessary for the long-term survival and recovery of the species..." (NMFS 1996).

Specific performance criteria from NMFS (1996) clearly define benchmarks for PFC baseline conditions. The following habitat indicators reflect PFC for western Oregon streams:

PATHWAY	INDICATORS	PFC METRIC
Habitat Elements:	Substrate	Gravel Or Cobble Substrate, <20% embeddedness
	Large Woody Debris	> 80 Pieces/Mile, >24" Diameter, >50 Ft. In Length, Rootwad Attached
	Pool Frequency	Varies With Channel Width[4]
	Pool Quality	Pools >1 Meter Deep With Good Cover And Cool Water
	Off-channel Habitat	Backwaters With Cover And Low Energy Off-channel Areas
	Refugia	Habitat Refugia Exist And Are Adequately Buffered By Intact Riparian Reserves
Channel Condition and Dynamics:	Width/Depth Ratio	<10
	Streambank Condition	>90% Stable
	Floodplain Connectivity	Off-channel Areas Are Frequently Hydrologically Linked To Main Channel; Overbank Flows Occur And Maintain Wetland Functions, Riparian Vegetation And Succession

[4]184 pools/mile @ 5-foot channel width, 96 pools/mile @ 10-foot channel width, 70 pools/mile @ 15-foot channel width, 56 pools/mile @ 20-foot channel width, 47 pools/mile @ 25-foot channel width, 26 pools/mile @ 50-foot channel width.

The East Reach. The East Reach will be an approximately 200-m long channel relocation reach beginning upstream of the currently degraded, roadside ditch channel of Bear Creek adjacent to the south side of Highway 26, bypassing the roadside ditch channel and reconnecting to the 150-meter long natural channel just above the Faubion Loop Road Bridge. The East Reach will be constructed along and, within swales formed at, or shortly after, the time of volcanic mudflow deposition running parallel to the valley axis. Because these upper portions of Bear Creek currently run intermittently, the East Reach will also run intermittently, naturally intercepting ground water.

The Bridge Reach. The Bridge Reach will be an approximately 35-m long channel relocation reach connecting the current natural Bear Creek channel to the Middle Reach channel relocation reach under the new Bear Creek bridge. Habitat features to be incorporated into the Bridge Reach will include a bio-engineered bank at the outside bend directing flow under the new bridge and a low flow thalweg under the bridge to concentrate surface water during summer base flows.

The Middle Reach. The Middle Reach will be an approximately 200-m long channel relocation reach beginning at the connection with the Bridge Reach routing Bear Creek around a reach of degraded roadside ditch channel adjacent to the northern shoulder of Highway 26. The Middle Reach will then connect into the 100 m long natural reach of Bear Creek that will be used as a model for construction of both the Middle Reach and the Western Reach channel relocation reaches.

The Western Reach. The Western Reach will be an approximately 165-m long channel relocation reach beginning upstream of the area where the model reach begins to again flow adjacent to the northern shoulder of highway 26. The Western Reach will route Bear Creek around a reach of degraded roadside ditch channel adjacent to the northern shoulder of Highway 26 and reconnect Bear Creek to a natural floodplain channel (likely another remnant overflow channel of the Zigzag River). This natural floodplain channel reconnects with the old Bear Creek channel a short distance downstream, just above the Lolo Pass Road culvert crossing.

Fish Rescue, Salvage and Relocation. Introduction of Bear Creek into the various relocation channel reaches and activities associated with the installation and removal of the temporary fish passage culvert extension at the current Bear Creek culvert crossing will require dewatering of the stream channel and fish rescue, salvage, and relocation efforts to minimize take of juvenile and adult salmonids. A team of experienced biologists from the USFS, ODFW, ODOT, and project consultants will develop a site-specific fish rescue, salvage, and relocation plan based on site-specific conditions, fish presence, equiptment availability, and experience of the fish rescue and salvage team. This fish rescue, salvage, and relocation plan will require approval by NMFS.

1.3 Biological Information and Critical Habitat

1.3.1 Lower Columbia River Steelhead

Although limited data are available to assess population numbers or trends, NMFS believes that many steelhead stocks comprising the LCR steelhead Evolutionary Significant Unit (ESU) are depressed compared with past abundance. The listing status and biological information for LC steelhead are described in Busby et al. (1996) and final listing determination in the Federal Register (March 19, 1998, 63 FR 13347). Critical habitat was designated for LCR steelhead on February 16, 2000 (65 FR 7764) and protective regulations were extended under section 4(d) of the ESA on July 10, 2000 (65 FR 42422).

Critical habitat for LCR steelhead includes the Columbia River and its tributaries between the Cowlitz and Wind Rivers in Washington and the Willamette and Hood Rivers in Oregon, inclusive. Excluded are steelhead in the Upper Willamette River Basin above Willamette Falls, and steelhead from the Little and Big White Salmon Rivers in Washington. Freshwater critical habitat includes all waterways, substrates, and adjacent riparian areas—areas adjacent to a stream that provides the following functions: Shade, sediment, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter—below longstanding, natural impassable barriers (i.e., natural waterfalls in existence for at least several hundred years) and several dams that block access to former LCR steelhead habitat. The action area is within LCR steelhead designated critical habitat.

Adult winter steelhead in this ESU typically re-enter the river systems starting in November through the end of March. Peak re-entry is in January and February. The adults spawn soon after reentering. The fry emerge from April and into July, and then rear in freshwater for 1 to 3-years. The juvenile fish smolt in the spring and migrate downstream to the Pacific Ocean from March through June during high spring flows. Summer steelhead reenter freshwater in June and July, and require several months of maturation before spawning. The summer steelhead overwinter in freshwater until they spawn in late winter to early spring. In the LCR steelhead ESU, most spawning occurs from March through May.

No estimates of historical (pre-1960s) abundance data are available for this ESU (Busby et al. 1996). Estimates from the 1980s showed that 75% of the total run was of hatchery origin. Habitat degradation is common throughout the ESU, primarily due to urbanization and logging. The habitat degradation affects summer steelhead more than winter steelhead. Past and present hatchery practices are a major threat to the genetic integrity of steelhead in the ESU.

The Sandy River Watershed is bisected by Marmot Dam at river mile (RM) 30. Upstream fish passage is regulated at the fish ladder and fish trap located at Marmot Dam. Fish passage monitoring at Marmot Dam has indicated a downward trend in wild LCR steelhead escapement

into the upper Sandy River watershed. Recent annual spawning escapement figures have ranged between a high of 2,916 (1991) and a low of 537 (1995) adults over the last decade[5]. Historically, Bear Creek supported runs of winter steelhead. Although recent occupancy of steelhead has not been documented, the project reach likely is occupied by adult and juvenile steelhead and utilized for reproduction and juvenile rearing. Fish passage problems and habitat degradation from construction and maintenance of the state, county, and private transportation system in the watershed are likely the primary causes for the decline of steelhead in the Bear Creek watershed.

1.3.2 Lower Columbia River Chinook Salmon

Although limited data are available to assess population numbers or trends, NMFS believes that many stocks comprising the LCR chinook salmon ESU are depressed compared with past abundance. The listing status and biological information for LCR chinook salmon are described in Myers et al. (1998) and final listing determination in the Federal Register (March 24, 1999, 64 FR 14308). Critical habitat was designated for LCR chinook salmon on February 16, 2000 (65 FR 7764) and protective regulations were extended under section 4(d) of the ESA on July 10, 2000 (65 FR 42422).

The ESU includes all naturally-spawned populations of chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run chinook salmon in the Clackamas River. Critical habitat for LCR chinook salmon is designated to include all river reaches accessible to listed chinook salmon in Columbia River tributaries between the Grays and White Salmon Rivers in Washington and the Willamette and Hood Rivers in Oregon, inclusive. Also included are adjacent riparian zones, and river reaches and estuarine areas in the Columbia River upstream to The Dalles Dam. Excluded are tribal lands and areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). Major river basins containing spawning and rearing habitats for this ESU comprise approximately 6,338 square miles in Oregon and Washington. Freshwater critical habitats include all waterways, substrates, and adjacent riparian areas—areas adjacent to a stream that provides the following functions: Shade, sediment, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter. The action area is within LCR chinook salmon designated critical habitat.

Fall chinook salmon return as adults in the late summer or fall. Adult fall chinook return to the Sandy River from late August through late September. Spawning occurs over the same period with the return of adults and spawning both peaking in September. Spawning occurs in deeper waters or small tributary streams. Eggs hatch the following spring. Juveniles start their

[5]Telephone conversation with Craig Foster, ODFW (February 11, 2002) confirming Marmot Dam adult fish passage totals by species 1990-2000.

downstream migration to the ocean in March and April and may spend a few weeks to a few months rearing in freshwater before moving slowly down the river as subyearlings.

No estimates of historical abundance are available for this ESU. The current production appears to be predominantly hatchery-driven with few identifiable native, naturally reproducing populations (Myers et al. 1998). Long and short-term trends in abundance of individual populations are mostly negative, some severely so. Freshwater habitat is in poor condition with problems related to forestry practices, urbanization and agriculture.

The Sandy River Watershed is bisected by Marmot Dam. Upstream fish passage is regulated as fish use the fish ladder and fish trap located at Marmot Dam. Fish passage monitoring at Marmot Dam has indicated a downward trend in LCR chinook salmon escapement into the upper Sandy River watershed. Recent annual spawning escapement figures have ranged between a high of 6,984 (1992) and a low of 1,503 (1995) adults over the last decade[6].

Historically, the lower reaches of Bear Creek provided rearing and refugia habitat for juvenile chinook salmon. Although recent occupancy of chinook salmon has not been documented, no barriers to rearing juvenile chinook salmon exist to preclude occupancy at, or below, the project reach. Fish passage problems and habitat degradation from construction and maintenance of the state, county, and private transportation system in the watershed are likely the primary causes for the decline of chinook salmon in the Bear Creek watershed.

1.4 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). The NMFS must determine whether the action is
likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the initial steps of: (1) Defining the biological requirements and current status of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NMFS evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NMFS must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. If NMFS finds that the action is likely to jeopardize the listed species, NMFS must identify reasonable and prudent alternatives for the action.

Furthermore, NMFS evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' designated critical habitat. NMFS must determine whether

[6]Telephone conversation with Craig Foster, ODFW (February 11, 2002) confirming Marmot Dam adult fish passage totals by species 1990-2000.

habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. NMFS identifies those effects of the action that impair the function of any essential element of critical habitat. If NMFS concludes that the action will destroy or adversely modify critical habitat, it must identify any reasonable and prudent measures available.

For the proposed action, NMFS' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NMFS' critical habitat analysis considers the extent to which the proposed action impairs the function of essential elements necessary for migration, spawning, and rearing of LCR steelhead and LCR chinook salmon under the existing environmental baseline.

1.4.1 Biological Requirements

The first step in the methods NMFS uses for applying the ESA section 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. The NMFS also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NMFS starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to a naturally reproducing population level at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful rearing and migration. The current status of the listed species, based upon their risk of extinction, has not significantly improved since the species were listed.

1.4.2 Environmental Baseline

The most recent evaluation of the environmental baseline for the Columbia River is part of the NMFS's Opinion for the Federal Columbia River Power System (FCRPS) issued in December 2000. This Opinion assessed the entire Columbia River system below Chief Joseph Dam and downstream to the farthest point (the Columbia River estuary and nearshore ocean environment) at which listed salmonids are influenced. For a detailed evaluation of the environmental baseline of the Columbia River basin please refer to the FCRPS Opinion (NMFS 2000).

The quality and quantity of freshwater habitats in much of the Columbia River basin have declined dramatically in the last 150 years. Forestry, farming, grazing, road construction, hydrosystem development, mining, and urbanization have radically changed the historical habitat conditions of the basin. Depending on the species, they spend from a few days to one or two

years in the Columbia River and its estuary before migrating out to the ocean and another one to four years in the ocean before returning as adults to spawn in their natal streams.

Water quality in streams throughout the Columbia River basin has been degraded by human activities such as dams and diversion structures, water withdrawals, farming and grazing, road construction, timber harvest activities, mining activities, and urbanization. Tributary water quality problems contribute to poor water quality where sediment and contaminants from the tributaries settle in mainstem reaches and the estuary. Temperature alterations also affect salmonid metabolism, growth rate, and disease resistance, as well as the timing of adult migrations, fry emergence, and smoltification. Many factors can cause high stream temperatures, but they are primarily related to land-use practices rather than point-source discharges. Loss of wetlands and increases in groundwater withdrawals have contributed to lower base-stream flows, which in turn contribute to temperature increases. Channel widening and land uses that create shallower streams also cause temperature increases.

Pollutants also degrade water quality. Salmon require clean gravel for successful spawning, egg incubation, and emergence of fry. Fine sediments clog the spaces between gravel and restrict the flow of oxygen-rich water to the incubating eggs. Excess nutrients, low levels of dissolved oxygen, heavy metals, and changes in pH also directly affect the water quality for salmon and steelhead.

The Sandy River Watershed is a southern tributary of the Columbia River, on the west side of Oregon's Cascade Mountains. For the purposes of fish management, the Sandy River Watershed is divided into the upper and lower Sandy River basins by Marmot Dam. The upper Sandy River basin is managed as a wild fish preserve with no hatchery fish releases or adult hatchery passage into the Sandy River above Marmot Dam. The upper Sandy River Watershed originates from the Sandy, Zigzag, and Reide Glaciers on the west slope of Mt Hood. From the headwaters, the upper Sandy River Watershed flows through several volcanic debris flows before entering the lower Sandy River Watershed.

Bear Creek is a tributary of the upper Sandy River Watershed at RM 42.3. Bear Creek flows across the surface of a 1500-year old volcanic mudflow. The dominant land uses in the Bear Creek watershed are Federal forest lands and to lesser degree, private forest lands and rural development.

Bear Creek has degraded habitat resulting from forestry practices, rural development, draining and filling of wetlands, and the construction and maintenance of the state, county, and local transportation infrastructure which drastically altered the natural drainage system. The large woody debris, off-channel habitat, pool frequency, and floodplain connectivity habitat indicators are *not properly functioning* within the action area because of chronic habitat degradation. In addition, the following environmental baseline indicators are *at risk*: subpopulation characteristics, temperature, sediment/turbidity, chemical contamination/nutrients, physical barriers, substrate, pool quality, streambank condition, refugia, changes to peak/base flows, disturbance history and riparian reserves.

Based on the best available information on the current status of LCR steelhead and LCR chinook salmon range-wide; the population status, trends, and genetics; and the poor environmental baseline conditions within the action area, NMFS concludes that the biological requirements of LCR steelhead and LCR chinook salmon within the action area are not currently being met. Actions that do not maintain or restore properly functioning aquatic habitat conditions would be likely to jeopardize the continued existence of LCR steelhead and LCR chinook salmon.

1.5 Analysis of Effects

1.5.1 Effects of the Proposed Action

Creeks and rivers are dynamic systems that naturally alter their courses in response to many physical processes. Roadways and other structures constructed along waterways are subject to flooding and undercutting as a result of these natural changes in the stream course. Structural hardening of embankments is the traditional means of protecting these structures along waterways. Hardened embankments simplify stream channels, alter hydraulic processes, and prevent natural channel adjustments (Spence et al. 1996). Moreover, embankment hardening may shift the erosion point either upstream or downstream of the project and accelerate stream velocity. As amplified erosive forces attack different locations and landowners respond with more bank hardening, the river eventually attains a continuous fixed alignment lacking habitat complexity (USACE 1977).

Fish habitats are enhanced by diversity of habitats at the land-water interface and adjacent bank (USACE 1977). Streamside vegetation provides shade that reduces water temperature and stabilizes stream banks. Overhanging branches provide cover from predators. Insects and other invertebrates that fall from overhanging branches may be preyed upon by fish, or provide food sources for other prey organisms. Immersed vegetation, logs, and root wads provide points of attachment for aquatic prey organisms, shelter from swift currents during high flows, retain bed load sediment, create pools, and reduce flow velocity.

Approximately 600 m of Bear Creek's channel currently runs adjacent to the hardened highway prism or through the hardened culvert crossing. Channel relocation will allow natural hydraulic processes (such as sediment transport and large woody debris accumulation) begin to function to create and maintain complex fish habitats in Bear Creek. While these natural hydraulic processes seek hydraulic equilibrium, maintaining a stable channel, relocation of Bear Creek into the adjacent forested lowlands will protect fish habitat from chronic degradation as a result of highway maintenance activities.

Sediment. Initial introduction of Bear Creek to relocated channels and excavation of bank material in the wetted channel at the various relocation channel reach connections will temporarily increase releases of sediment. Transportation of sediments to Bear Creek from upland construction activities is also possible. Upland excavation will expose and dislodge soils, increasing erosion and stream turbidity during rainfall. An increase in turbidity from suspension

of fine sediments can adversely affect fish and filter-feeding macro-invertebrates downstream of the work site. At moderate levels, turbidity has the potential to reduce primary and secondary productivity; at higher levels, turbidity may interfere with feeding and may injure and even kill both juvenile and adult fish (Spence et al. 1996, Berg and Northcote 1985).

To minimize the potential for increased turbidity and disturbance of fish, in-water work will occur only during the Oregon Department of Fish and Wildlife (ODFW) recommended in-water work window (July 15 through August 31) or as approved by NMFS and ODFW biologists. During this window, creek flows are typically low, fish presence is reduced, and rainfall is minimal. In-water work area isolation will allow the work to occur in the dry, thereby reducing turbidity and disturbance of fish. During this period, rearing juveniles may be present if water temperatures remain within the tolerance range of local individuals, but adult spawning and egg incubation would not be occurring. The precipitation probability increases greatly after August 31.

Chemical Contamination. As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of the back-hoes, excavators, and other equipment requires the use of fuel, lubricants, etc., which, if spilled into the channel of a water body or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain poly-cyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985). Similarly, exposure to herbicides can have lethal and sublethal effects on salmonids, aquatic invertebrates, aquatic vegetation, and target and non target riparian vegetation (Spence *et al.* 1996).

To minimize the potential for chemical contamination and disturbance of fish, in-water work will occur only during the ODFW recommended in-water work window (July 15 through August 31) or as approved by NMFS and ODFW biologists. During this window, streamflow is typically low, fish presence is reduced, and rainfall is minimal. In-water work area isolation will allow the work to occur in the dry, thereby reducing indirect (chemical contaminants) from entering the actively flowing water and direct impacts to fish. The applicant does not propose the use of herbicides.

Loss of Primary Productivity. The proposed actions will likely result in a short-term reduction in primary productivity in the newly constructed channel relocation reaches. As Bear Creek is introduced into these new reaches, redistribution of aquatic vegetation and benthic invertebrates will result in a temporary reduction in availability of food for rearing juvenile salmonids. NMFS expects long-term increases in the availablity of benthic invertebrates as a food source for juvenile salmonids due to: 1) Increases in total channel length, 2) the increased complexity of habitat in Bear Creek including in-channel placement of large woody debris; and 3) revegetation of the new channel with transplanted native wetland and riparian species.

Water Quality Stormwater Effects. The potential exists for an increase in runoff, high in pollutants, into Bear Creek from the proposed 16,350 m^2 of new impervious surface (Booth and Jackson 1997). However, the proposed stormwater runoff treatment system will more than offset any potential increase in adverse effects to water quality as a result of the proposed action. The proposed stormwater treatment system will treat stormwater runoff from 53,450 m^2 of new and existing impervious surfaces. This stormwater treatment system includes construction of a various engineered and non-engineered features designed to remove between 70% and 100% of TSS, oil, grease and floatables from storms up to and including a water quality storm event. The fully treated stormwater will then discharge into existing riparian areas prior to entering the Bear Creek channel. The proposed project is expected have a net beneficial effect on water quality in Bear Creek in the long term.

Hydrologic Stormwater Effects. The potential exists for reduced evapotransporation and infiltration opportunities resulting in increase the magnitude and duration of peak discharge and decrease summer base flow from the proposed 16,350 m^2 of new impervious surface (Booth and Jackson 1997). However, the proposed stormwater runoff treatment system will more than offset any potential adverse effects to hydrology from the proposed action.

This stormwater treatment system includes construction of inline engineered and non-engineered features designed to infiltrate and evapotraspirate stormwater runoff from the 53,450 m^2 of new and existing impervious surfaces. All stormwater runoff that has not been infiltrated or evapotransporated in the stormwater treatment system will discharged into existing riparian areas prior to entering the Bear Creek channel. The balance of pre-project evapotransporation, infiltration and discharge rates compared with post-project rates will likely result in no net increase in magnitude or duration of peak discharge from the water quality storm event. NMFS expects significant long-term beneficial effects in Bear Creek from attenuation of peak discharges and potential increased contribution to summer base flow in Bear Creek as measured by Bear Creek's annual hydrograph.

Riparian Vegetation. Woody riparian vegetation provides large wood to the stream, which encourages the creation of rearing and spawning areas. Riparian vegetation also provides water quality functions (e.g. temperature control and nutrient transformation), bank stability, detritus (insect and leaf input, small wood for substrate for insects, etc.), microclimate formation, floodplain sediment retention and vegetative filtering, and recharge of the stream hyporheic zone. Relocation of the four reaches of Bear Creek away from the current degraded roadside ditch reaches back into the mature second growth forest will result in long-term beneficial effects to Bear Creek. The gain of mature 20 to 30-m wide woody riparian buffers between Bear Creek and Highway 26 will increase the ability of the new riparian area to support natural stream processes, including processes essential to supporting salmon in the short-term and long-term.

Stream Hydraulics. The construction of the new Bear Creek Bridge over the Bridge Reach will decrease hydraulic constriction, improve fish passage, and improve general ecological connectivity such as sediment transport and large woody debris transport within the Bear Creek Watershed.

The three other Bear Creek channel relocation reaches will be constructed to restore eight, and improve the remaining two, of the 10 habitat indicators listed as *not properly functioning* and *at risk* in the baseline conditions analysis for the Bear Creek Watershed. Long-term beneficial effects to Bear Creek are expected in not only the specific habitat indicators, but also for the habitat forming and maintaining processes such as large woody debris recruitment, channel migration, and floodplain connectivity.

Fish Rescue, Salvage and Relocation. As a result of the Bear Creek channel relocations, extensive reaches of the degraded channel will be dewatered. Rescue, salvage and relocation of fish and other aquatic species will result in the potential capture and handling of up to 350 juvenile and adult salmonids. Assuming a 5% direct or delayed mortality rate from capture and relocation stress, up to 18 juvenile or adult salmonids may be killed. NMFS anticipates up to 100 listed juvenile steelhead or chinook salmon will be handled resulting in the lethal take of up to five listed juvenile steelhead or chinook salmon.

1.5.2 Effects on Critical Habitat

Potential short-term adverse effects of the proposed action to designated critical habitat include increased turbidity, chemical contamination, and loss of primary productivity in the relocated reaches during construction and from precipitation during construction. These effects would be largely avoided by project timing (i.e., dry season) and work area isolation, as described above in *Effects of the Proposed Action*.

The NMFS expects long-term beneficial effects to baseline conditions from improved water quality and hydrologic conditions as a result of the proposed stormwater treatment system. Habitat features and habitat forming processes will be restored or improved within the various channel relocations resulting in long-term beneficial effects to most if not all of the pathways and indicators to PFC for the Bear Creek watershed.

1.5.3. Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation." Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed action.

The NMFS is not aware of any specific future non-federal activities within the action area that would cause greater impacts to listed species than presently occurs. The NMFS assumes that future private and state actions will continue at similar intensities as in recent years.

1.6. Conclusion

The NMFS has determined that, based on the available information, the proposed action is not likely to jeopardize the continued existence of LCR steelhead and LCR chinook salmon or result in the destruction or adverse modification of critical habitat. The NMFS used the best available scientific and commercial data to analyze the effects of the proposed action on the biological requirements of the species relative to the environmental baseline, together with cumulative effects. NMFS applied its evaluation methodology (NMFS 1996) to the proposed action and found that it could cause slight degradation of anadromous salmonid habitat due to increases in sedimentation and turbidity. Furthermore, NMFS expects that construction related effects and work isolation activities could alter normal feeding and sheltering behavior of juvenile LCR steelhead and LCR chinook salmon should any be present in the action area during the proposed action. NMFS expects some direct or delayed mortality of juvenile LCR steelhead and LCR chinook salmon as a result of fish rescue, salvage and relocation activitities should any be present in the action area during the proposed action. These effects will be temporary.

Our conclusions are based on the following considerations: (1) Most of the proposed work will occur outside of the flowing waters of Bear Creek (i.e., in the dry), (2) in-water work will occur during the ODFW's preferred work window of July 15 through August 31, which NMFS expects to minimize the likelihood of LCR steelhead and LCR chinook salmon presence in the action area due to low flow and warm water conditions, (3) any increases in sedimentation and turbidity to the lower reaches of Bear Creek will be short-term and minor in scale and would not change or worsen existing conditions for stream substrate in the action area, and (4) all other effects described in Section 1.5 above will be beneficial over the long-term.

2. INCIDENTAL TAKE STATEMENT

Section 4 (d) and section 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering (50 CFR 222.102; October 1, 2000). Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets

forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

2.1 Amount or Extent of the Take

The NMFS anticipates that the actions covered by this Opinion are reasonably likely to result in incidental take of LCR steelhead and LCR chinook salmon because of adverse effects from increased sediment levels and chemical contamination and the potential for direct incidental take during in-water work. Handling of juvenile steelhead and chinook salmon during the work isolation process may result in incidental take of individuals if adequate water quality allows juvenile salmonids to be present during the construction period. The NMFS anticipates non-lethal incidental take of up to 100 individuals, of which, lethal take of up to 5 juvenile steelhead and/or chinook could occur as a result of the fish rescue, salvage and relocation activities covered by this Opinion. The effects of the other activities on population levels are largely unquantifiable and NMFS does not expect them to be measurable in the long term. The extent of authorized take is limited to LCR steelhead and LCR chinook salmon in Bear Creek and is limited to that caused by the proposed actions within the action area.

2.2 Reasonable and Prudent Measures

The measures described below are non-discretionary. They must be implemented so that they become binding conditions in order for the exemption in section 7(o)(2) to apply. The FHWA has the continuing duty to regulate the activities covered in this incidental take statement. If the FHWA fails to require the contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

The NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the above species. The FHWA shall:

1. Minimize the likelihood of incidental take from channel relocation or streambank alteration actions by directing the contractor to use an approach that maximizes ecological functions and the best available bioengineering technology.

2. Minimize the likelihood of incidental take from activities involving highway construction, bridge construction, channel relocation, temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage by directing the contractor to avoid or minimize disturbance to riparian and aquatic systems.

3. Minimize the likelihood of incidental take from in-water work activities by ensuring that the in-water work activities (culvert extension and channel relocation) are isolated from flowing water.

4. Complete a comprehensive monitoring and reporting program to ensure implementation of these conservation measures are effective in minimizing the likelihood of take from permitted activities.

2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, FHWA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity.

1. To Implement Reasonable and Prudent Measure #1 (channel relocation or streambank alteration actions), the FHWA shall ensure that:
   a. The use of rock and riprap is avoided or minimized.
      i. Rock will be individually placed in a way that produces an irregularly contoured face to provide velocity disruption. No end dumping will be allowed.

   b. Any instream large wood or riparian vegetation that is moved or altered during construction will stay on site or be replaced with a functional equivalent.

   c. Where feasible, the bankline will be revegetated using natural vegetation.

2. To implement Reasonable and Prudent Measure #2 (construction and channel relocation), the FHWA shall ensure that:
   a. Project design. Alteration or disturbance of the stream banks and existing riparian vegetation will be minimized.

   b. In-water work. All work within the active channel will be completed within the following in-water work period (July 15 - August 31) for the site as recommended by ODFW[5]. Extensions of the in-water work period must be approved by NMFS.
   c. Pollution and erosion control plan. A Pollution and Erosion Control Plan (PECP) will be developed for the project to prevent point-source pollution related to construction operations. The PECP will contain the pertinent elements listed below and meet requirements of all applicable laws and regulations:
      i. Methods that will be used to prevent erosion and sedimentation associated with access roads, construction sites, equipment and material storage sites, fueling operations and staging areas.
      ii. A description of the hazardous products or materials that will be used, including inventory, storage, handling, and monitoring.

[5] Oregon Department of Fish and Wildlife, *Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 12 pp (June 2000)(identifying work periods with the least impact on fish)(http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt/0600_inwtrguide.pdf).

iii. A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on site, proposed methods for disposal of spilled materials, and employee training for spill containment.

iv. Measures that will be taken to prevent construction debris from falling into any aquatic habitat. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

d. Pre-construction activities. Prior to significant alteration of the action area, the following actions will be accomplished.

i. Boundaries of the clearing limits associated with site access and construction are flagged to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. A supply of erosion control materials (e.g., silt fence and straw bales) is on hand to respond to sediment emergencies. Sterile straw or hay bales will be used when available to prevent introduction of weeds.

iii. All temporary erosion controls (e.g., straw bales, silt fences) are in-place and appropriately installed downslope of project activities within the riparian area. Effective erosion control measures will be in-place at all times during the contract, and will remain and be maintained until such time that permanent erosion control measures are effective.

e. Earthwork. Earthwork, including drilling, blasting, excavation, dredging, filling and compacting, is completed in the following manner:

i. Boulders, rock, woody materials and other natural construction materials used for the project must be obtained from outside of the riparian area or as otherwise approved by NMFS.

ii. Specific habitat characteristics along the channel relocation reaches will meet or exceed performance measures for individual habitat specific indicators under PFC[6] or other appropriate performance measures as approved by NMFS.

iii. Material removed during excavation will only be placed in locations where it cannot enter streams or other water bodies.

iv. All exposed or disturbed areas will be stabilized to prevent erosion.

[6]NMFS (National Marine Fisheries Service). 1996. Making Endangered Species Act determinations of effect for individual and grouped actions at the watershed scale. Habitat Conservation Program, Portland, Oregon, 32 p.

(1) Areas of bare soil within 150 feet of waterways, wetlands or other sensitive areas will be stabilized by native seeding,[7] mulching, and placement of erosion control blankets and mats, if applicable, quickly as reasonable after exposure, but within 7 days of exposure.
(2) All other areas will be stabilized as quickly as reasonable, but within 14 days of exposure.
(3) Seeding outside of the growing season will not be considered adequate for permanent stabilization.

f. Heavy Equipment. Heavy equipment use will be fueled, maintained and stored as follows.
i. Vehicle staging, maintenance, refueling, and fuel storage areas will be a minimum of 150 feet horizontal distance from any stream.
ii. All vehicles operated within 150 feet of any stream or water body will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired before the vehicle resumes operation.
iii. When not in use, vehicles will be stored in the vehicle staging area.

g. Site restoration. Site restoration and clean-up, including protection of bare earth by seeding, planting, mulching and fertilizing, will be done in the following manner.
i. Disturbed areas will be planted with native vegetation specific to the project vicinity or the region of the state where the project is located, and will comprise a diverse assemblage of woody and herbaceous species.
ii. No herbicide application will occur as part of this permitted action. Mechanical removal of undesired vegetation and root nodes is permitted.
iii. No surface application of fertilizer will be used within 50 feet of any stream channel as part of this permitted action.
iv. Plantings will achieve an 80 percent survival success after five years.
(1) If success standard has not been achieved after 5 years, the applicant will submit an alternative plan to NMFS. The alternative plan will address temporal loss of function.
(2) Plant establishment monitoring will continue and monitoring reports will be submitted to the NMFS on an annual basis until site restoration success has been achieved.

3. To implement Reasonable and Prudent Measure #3 (in-water work area activities), the FHWA shall ensure that the in-water work activities (culvert extension and channel relocation) are conducted are isolated from flowing water.

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[7] By Executive Order 13112 (February 3, 1999), Federal agencies are not authorized to permit, fund or carry out actions that are likely to cause, or promote, the introduction or spread of invasive species. Therefore, only native vegetation that is indigenous to the project vicinity, or the region of the state where the project is located, shall be used.

a. If the fish salvaging aspect of this project requires the use of seine equipment to capture fish, it must be accomplished as follows:
   i. Before and intermittently during pumping, attempts will be made to seine and release fish from the work isolation area as is prudent to minimize risk of injury.
   ii. Seining will be conducted by, or under the supervision of a fishery biologist experienced in such efforts. Staff working with the seining operation must have the necessary knowledge, skills, and abilities to ensure the safe handling of all ESA-listed fish.
   iii. ESA-listed fish must be handled with extreme care and kept in water to the maximum extent possible during seining and transfer procedures. The transfer of ESA-listed fish must be conducted using a sanctuary net that holds water during transfer, whenever appropriate, to prevent the added stress of an out-of-water transfer.
   iv. Seined fish must be released as near as possible to capture sites.
   v. The FHWA shall ensure that the transfer of any ESA-listed fish to third parties other than NMFS personnel receives prior approval from NMFS.
   vi. The FHWA shall ensure that any other Federal, state, and local permits and authorizations necessary for the conduct of the seining activities will be obtained prior to project seining activity.
   vii. The FHWA must allow NMFS or its designated representative to accompany field personnel during the seining activity, and allow such representative to inspect the seining records and facilities.
   viii. A description of any seine and release effort will be included in a post-project report, including the name and address of the supervisory fishery biologist, methods used to isolate the work area and minimize disturbances to ESA-listed species, stream conditions before and following placement and removal of barriers, the means of fish removal, the number of fish removed by species, the condition of all fish released, and any incidence of observed injury or mortality.

b. If the fish salvaging aspect of this project requires the use of electrofishing equipment to capture fish, it must be accomplished as follows (NMFS 2000):
   i. Electrofishing may not occur near listed adults in spawning condition or near redds containing eggs.
   ii. Equipment must be in good working condition. Operators must go through the manufacturer's preseason checks, follow all provisions, and record major maintenance work in a log.
   iii. A crew leader having at least 100 hours of electrofishing experience in the field using similar equipment must train the crew. The crew leader's experience must be documented and available for confirmation; such documentation may be a logbook. The training must occur before an inexperienced crew begins any electrofishing; it must also be conducted in waters that do not contain listed fish.

iv. Measure conductivity and set voltage as follows:

	Conductivity (umhos/cm)	Voltage
(1)	Less than 100	900 to 1100
(2)	100 to 300	500 to 800
(3)	Greater than 300	150 to 400

v. Direct current (DC) must be used at all times.

vi. Each session must begin with pulse width and rate set to the minimum needed to capture fish. These settings should be gradually increased only to the point where fish are immobilized and captured. Start with pulse width of 500 us and do not exceed 5 milliseconds. Pulse rate should start at 30Hz and work carefully upwards. In general, pulse rate should not exceed 40 Hz, to avoid unnecessary injury to the fish.

vii. The zone of potential fish injury is 0.5 m from the anode. Care should be taken in shallow waters, undercut banks, or where fish can be concentrated because in such areas the fish are more likely to come into close contact with the anode.

viii. The monitoring area must be worked systematically, moving the anode continuously in a herringbone pattern through the water. Do not electrofish one area for an extended period.

ix. Crew members must carefully observe the condition of the sampled fish. Dark bands on the body and longer recovery times are signs of injury or handling stress. When such signs are noted, the settings for the electrofishing unit may need adjusting. Sampling must be terminated if injuries occur or abnormally long recovery times persist.

x. Whenever possible, a block net must be placed below the area being sampled to capture stunned fish that may drift downstream.

xi. The electrofishing settings must be recorded in a logbook along with conductivity, temperature, and other variables affecting efficiency. These notes, with observations on fish condition, will improve technique and form the basis for training new operators.

4. To implement Reasonable and Prudent Measure #4 (monitoring and reporting), the FHWA shall ensure that:

a. Within 120 days of completing the project, the FHWA shall ensure submital of a monitoring report to NMFS describing the FHWA's success meeting their permit conditions. This report will consist of the following information.

i. Project identification.

(1) Project name,

(2) starting and ending dates of work completed for this project,

(3) the FHWA contact person.

ii. Isolation of in-water work area. All projects involving isolation of in-water work areas must include a report of any seine and release activity including:

(1) The name and address of the supervisory fish biologist,
(2) methods used to isolate the work area and minimize disturbances to fish species,
(3) stream conditions prior to and following placement and removal of barriers,
(4) the means of fish removal,
(5) the number of fish removed by species,
(6) the location and condition of all fish released, and
(7) any incidence of observed injury or mortality.

iii. Pollution and erosion control. A summary of all pollution and erosion control inspection reports, including descriptions of any failures experienced with erosion control measures, efforts made to correct them and a description of any accidental spills of hazardous materials.

iv. Site restoration. Documentation of the following conditions:
(1) Finished grade slopes and elevations.
(2) Log and rock structure elevations, orientation, and anchoring, if any.
(3) Planting composition and density.
(4) A plan to inspect and, if necessary, replace failed plantings and structures for a period of 5 years, including the compensatory mitigation site.

v. A narrative assessment of the effects of the project and compensatory mitigation on natural stream function.

vi. Photographic documentation of environmental conditions at the project site before, during and after project completion.
(1) Photographs will include general project location views and close-ups showing details of the project area and project, including pre- and post-construction.
(2) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
(3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

b. On an annual basis, for 5 years after completing the project, the FHWA shall ensure submital of a monitoring report to NMFS describing the FHWA's success in meeting their habitat restoration goals in relocating the Bear Creek channel. This report will consist of the following information.

i. Project identification.
(1) Project name,
(2) starting and ending dates of work completed for this project, and
(3) the FHWA contact person.

ii. Site and channel relocation restoration. Documentation of the following conditions:
   (1) Any changes in log and rock structure elevations, orientation, and anchoring.
   (2) Any changes in planting composition and density.
   (3) A plan to inspect and, if necessary, replace failed plantings and structures, including the compensatory mitigation site.

iii. A narrative assessment of the effects of the project and compensatory mitigation on natural stream function.

iv. Photographic documentation of environmental conditions at the project site after project completion as they relate directly to specific performance criteria identified in 2(e)(ii) above.
   (1) Photographs will include general project location views and close-ups showing details of the project area and habitat features of the channel relocated reaches.
   (2) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
   (3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, as they relate directly to specific performance criteria identified in 2(e)(ii) above.

c. Submit monitoring reports to:

National Marine Fisheries Service
Oregon Habitat Branch, Habitat Conservation Division
Attn: OHB2002-0059
525 NE Oregon Street, Suite 500
Portland, Oregon 97232-2778

d. If a dead, injured, or sick endangered or threatened species specimen is located, initial notification must be made to the National Marine Fishery Service Law Enforcement Office, located at Vancouver Field Office, 600 Maritime, Suite 130, Vancouver, Washington 98661; phone: 360/418-4246. Care will be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

3. MAGNUSON-STEVENS ACT

3.1 Background

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed action may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NMFS on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50CFR600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH.
- NMFS shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH.
- Federal agencies shall within 30 days after receiving conservation recommendations from NMFS provide a detailed response in writing to NMFS regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NMFS, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NMFS is required by Federal agencies undertaking, permitting or funding activity that may adversely affect EFH, regardless of its location.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Pacific salmon: chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based on this information.

3.4 Proposed Actions

The proposed action is detailed above in section 1.2 of this document. For the purposes of this consultation, the action area is defined as the streambed and streambank of Bear Creek extending to the upstream project disturbance limits and downstream one mile below the project disturbance limits. This area has been designated as EFH for various life stages of chinook salmon and coho salmon.

3.5 Effects of Proposed Action

As described in detail in section 1.5 of this document, the proposed activities may result in short-term adverse effects to water quality (sediment and chemical contamination). Long-term beneficial effects are likely from improved stormwater treatment, hydraulic conditions under the new bridge, and improved habitat characteristics and habitat forming processes in the relocated channels of Bear Creek.

3.6 Conclusion

The proposed action may adversely affect the EFH for chinook and coho salmon.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the Magnuson-Stevens Act, NMFS is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the FHWA, all of the Reasonable and Prudent Measures and the Terms and Conditions contained in sections 2.2 and 2.3 are applicable to salmon EFH. Therefore, NMFS incorporates each of those measures here as EFH recommendations.

3.8 Statutory Response Requirement

Please note that the Magnuson-Stevens Act (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NMFS after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NMFS, the agency must explain its reasons for not following the recommendation.

3.9 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NMFS if either action is substantially revised or new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600.920).

4. LITERATURE CITED

Section 7(a)(2) of the ESA requires biological opinions to be based on the best scientific and commercial data available. This section identifies the data used in developing this Opinion.

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